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ON THE RELATIONSHIP OF THE SOUTH AFRICAN PERMIAN REPTILES TO THOSE OF RUSSIA

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Professor Williston¹ has lately issued a paper entitled "Primitive Reptiles: A Review" in which he sums up the present state of our knowledge of the American Permian reptiles. More briefly he discusses the Permian reptiles of Europe; and has some references to the South African types. Williston deals only with the lower Permian reptiles, and as we know only very few reptiles from the lower Permian rocks of South Africa the references to our African types are brief. As, however, possibly he or some other will later be discussing Permian reptiles in general, some new facts which I wish to state will probably be welcomed. Williston is inclined to regard our Karroo beds which contain *Pareiasaurus* as Upper Permian, since the *Pareiasaurus* beds of North Russia are undoubtedly Upper Permian. In this I think he is incorrect.

In the Karroo we have a continuous series of shales and sandstones from the Droyha conglomerate which we may regard as basal Permian up to the Molteno beds which we know to be Rhaetic. Thus we have the whole Permian and Triassic periods represented by about 9,500 feet of strata. The whole thickness we can subdivide into zones as follows:

Burghersdorp beds	2,000 ft.
<i>Lystrosaurus</i> and <i>Procolophon</i> zone	2,000 ft.
<i>Cistecephalus</i> zone	1,000 ft.
<i>Endothiodon</i> zone	1,000 ft.
<i>Pareiasaurus</i> zone	1,000 ft.
Ecca beds	2,000 ft.
Droyha shales	500 ft.

¹ S. W. Williston, "Primitive Reptiles: A Review," *Journal of Morphology*, XXIII, No. 4, December, 1912.

The thicknesses of the various zones are only very approximate and vary considerably in different parts of the country. The Burghersdorp beds contain the following European genera *Trematosaurus*,¹ *Cyclotosaurus*, *Capitosaurus*, besides others allied to European Triassic forms and there can be no doubt that the beds are of Upper Triassic age. The *Lystrosaurus* and *Procolophon* zones may be regarded as corresponding to the Lower Triassic of Europe, though we have no genera corresponding to those of Europe.

All the zones from the *Cistecephalus* to the Droyha may be taken as representing the European Permian, and this is confirmed by the fact that the Russian "*Pareiasaurus*" zone corresponds, not with our *Pareiasaurus* zone, but with our *Cistecephalus* zone.

Anyone who is familiar with our typical South African *Pareiasaurus* and then looks at the Dwina Pareiasaurs will at once see that the resemblance is not striking; and had I found the Russian species at the Cape, I should have put it in a new genus probably. Just recently a new Pareiasaurian was discovered by Haughton in the *Cistecephalus* zone, and it has been described by Haughton and myself as a new genus, *Pareiasuchus peringaeyi*, and we have called attention to the fact that it resembles the Russian animals much more than does our older *Pareiasaurus*. But of much more importance than the doubtful *Pareiasaurus* is the Russian *Inostrausewia*. This is a huge carnivorous reptile something like our carnivorous types. But no known Therocephalians from our *Pareiasaurus* zone are the least like *Inostrausewia*.

Just recently we have got evidence that our Permian carnivora can be conveniently subdivided into two groups. The lower forms are the typical Therocephalians: the upper I am placing in a distinct group, the Gorgonopsia. It matters little whether this be regarded as a distinct family or suborder. I prefer to call it a distinct suborder. A paper is at present in the press dealing with the distinction of the groups. Though our small Gorgonopsian is known from the *Pareiasaurus* zone, it is in the *Cistecephalus* zone that the group becomes pre-eminent. A large South African type recently described as *Scymnognathus tigriceps* is possibly identical

¹ It is just possible *Trematosaurus* may be from the *Lystrosaurus* zone.

generically with *Inostrausewia*. Certainly it is closely allied, and certainly *Inostrausewia* is a Gorgonopsian.

If I were shown the Russian Dicynodonts and were told they had come from South Africa and were asked from what zone I thought they had come I should unhesitatingly say that they must come from the *Cistecephalus* zone. Nothing like them is known from any of the earlier zones and in the *Cistecephalus* zone we get Dicynodonts strikingly similar. I have therefore little hesitation in affirming that the Russian fauna of the Dwina is the fauna of our South African *Cistecephalus* zone, and this confirms the view I expressed eight years ago, that the *Cistecephalus* zone represents our most recent Permian beds and that our typical Pareiasaurs are Middle Permian. In the present state of our knowledge we may regard our Pareiasaurian genera distributed as follows:

<i>Cistecephalus</i> zone.....	<i>Pareiasuchus, Propappus</i>
<i>Endothiodon</i> zone.....	<i>Propappus, Anthodon</i>
<i>Pareiasaurus</i> zone.....	<i>Pareiasaurus</i>